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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
HAMA, JOANNE	

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1632	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/560,501	MOOTHA ET AL.	
	Examiner	Art Unit	
	JOANNE HAMA	1632	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 December 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *93,106-112 and 115-127* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *93,106-112 and 115-127* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant filed a response to the Non-Final Action of June 9, 2008 on December 11, 2009. Responses were also filed to address the non-compliant amendment (March 18, 2009) on April 23, 2009 and a restriction requirement (August 5, 2009) on December 2, 2009.

In the claims filed April 23, 2009, claims 2-16, 18, 21-34, 36-41, 43-46, 48-77, 79-92, 94-105 are cancelled. Claims 1, 17, 19, 20, 35, 42, 47, 78, 113-117 are withdrawn. Claims 17, 42, 47, 78, 93, 106-110, 112, 115 are amended. Claims 118-126 are new.

In the claims filed December 2, 2009, claims 2-16, 18, 20-34, 36-41, 43-46, 48-77, 79-92, 94-105 are cancelled. Claim 115 is amended. Claims 1, 17, 19, 35, 42, 47, 78, 113, 114 are withdrawn. Claim 127 is new.

Claims 93, 106-112, 115-127 are pending.

Election/Restrictions

Applicant's election of "in vitro followed by in vivo" as a species election in the reply filed on December 2, 2009 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 93, 106-112, 115-127, drawn to a method for identifying an agent that regulates expression of OXPHOS-CR genes, are under consideration.

Specification

Applicant indicates that replacement figures for figures 3-5 have been filed December 11, 2008. In response, this is persuasive and the objection as it applies to the specification is withdrawn.

Withdrawn Rejections

35 USC § 112, 1st parag.

Applicant's arguments, see pages 11-17 of Applicant's response, filed December 11, 2008, with respect to the rejection of claims 93, 106-112 have been fully considered and are persuasive. Applicant indicates that decreased OXPHOS-CR gene expression does not need to be "causative" of diabetes of a mitochondrial disease or disorder in order for compounds to be identified in the claimed screen. That is, the screen would identify agents that shift the physiological state of a subject to a more normal state (Applicant's response, page 12). The rejection of claims 93, 106-112 has been withdrawn.

35 USC § 102

Applicant's arguments, see page 17 of Applicant's response, filed December 11, 2008, with respect to the rejection of claims 93, 106, 107 have been fully considered and are persuasive. The claims have been amended to identifying an agent that increases the expression of two OXPHOS-CR gene products, while Burke et al. teach increase in Cox5b expression and decrease in Cyc1. The rejection of claims 93, 106, 107 has been withdrawn.

New Rejections

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 93, 106-112, 115-121, 124-127 are newly rejected under 35 U.S.C. 102(b) as being anticipated by Attie et al., WO 02/22886, published March 21, 2002.

Attie et al. teach that that a microarray was used to determine gene expression patterns in adipose tissue of obese individuals and diabetic individuals, by using the mouse model (Attie et al., page 3, parag. 00012). Attie et al. teach that Tables 1, 2, and 3 summarize the results of this analysis. Table 1 lists the genes for which decreased levels of gene expression was found with increasing obesity in each mouse strain. Table 2 shows the list of genes that increase in expression with increased obesity. Table 3 lists the changes in gene expression that correlated with the development of hyperglycemia. Table 1 shows that there are groups of genes, including those associated with mitochondrial function (Attie et al., page 4, parags 00015-00016, Table 1, pages 12-13). "Similar to succinate dehydrogenase" (mouse accession number aa245912, human accession number NM_003000) is the same as SDHB and "similar to cytochrome c1" (mouse accession number aa466050, human accession number BC001006) is the same as CYC1 (see NCBI printouts, Homo sapiens cytochrome c-1,

mRNA, NCBI [online], 2006 [retrieved on 2010-02-25]. Retrieved from the Internet:< URL: http://www.ncbi.nlm.nih.gov/nuccore/12654366>, pages 1-4, and Homo sapiens succinate dehydrogenase complex, subunit B, iron sulfur (Ip) (SDHB), nuclear gene encoding mitochondrial protein, mRNA, NCBI [online], 2010 [retrieved on 2010-02-25]. Retrieved from the Internet:< URL: http://www.ncbi.nlm.nih.gov/nuccore/115387093>, pages 1-7). Attie et al. teach that their results can be used to design techniques for intervention in the progression of diabetes. One would be able to upregulate genes which would otherwise be in the process of downregulation and that this can be achieved by using gene therapy or by substances that induce genes (Attie et al., page 7, parag. 00027). Attie et al. teach that while the data was gathered in a mouse model, the data is largely useful in humans (Attie et al., page 8, parag. 00028).

With regard to the claims being drawn to practicing the method in skeletal muscle cells (claim 119), while Attie et al. teach that their study was carried out in adipose tissue (Attie et al., page 4, parag. 00014), they teach other tissues, such as muscle, liver, and pancreatic b-cells should also be studied to determine their role in diabetes (Attie et al., page 6, parag. 00021).

Thus, the claims are rejected.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

> invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 93, 118, 122-123 are newly rejected under 35 U.S.C. 103(a) as being unpatentable over Attie et al., WO 02/22886, published March 21, 2002, Scherf et al., 2000, Nature Genetics, 24: 236-244.

As discussed above, Attie et al. teach that a microarray was used to determine the difference in expression of various genes in adipose tissue of obese and diabetic mouse models and those of wild type mice. Attie et al. teach that genes SDHB and CYC1 are downregulated in adipose tissue of mice. Attie et al. teach that their microarray results can be used to design techniques for the intervention in the progression of diabetes, wherein genes that are downregulated in the disease state can be upregulated.

While Attie et al. generally teach that downregulated genes can be upregulated, they do not specifically teach that designing techniques for the intervention of the progression of diabetes includes carrying out the method in parallel on multiple populations of cells and that each population is contacted with different agents (claims 122-123).

At the time of filing, the art teaches that gene expression levels in a number of cell lines can be measured simultaneously following their treatment with a library of compounds. For example, Scherf et al. teach that cDNA microarrays can be used to assess gene expression profiles of multiple cancer cell lines in a drug discovery screen (Scherf et al., abstract). Scherf et al. provides guidance that artisans were actively

using microarrays to identify genes in various cell types that are affected in a disease state and are subsequently affected in the presence of a compound.

All of the component parts are taught in Attie et al. and Scherf et al. The only difference is the combination of the "old elements" into a single method of screening multiple populations of cells with different agents to be assessed.

It would have been obvious for an artisan to screen different chemical compounds on various cell types from diabetic patients in order to find chemical compounds that upregulate SDHB and CYC1. With regard to screening multiple tissue types, at the time of filing, Attie et al. teach that in addition to adipose tissue, an artisan can also look at other tissues that affect diabetes, such as muscle, liver, and pancreatic b-cells (Attie et al., page 6, parag. 00021). As such, an artisan would have included these tissue types with adipose tissue in order to identify any drug that would have a beneficial effect on treating diabetes. With regard to using a library of compounds (claim 123), Scherf et al. illustrate that large collections of candidate compounds are known in the art. It would have been obvious for an artisan to take large collections of compounds and test them on disease tissue in order to find compounds that ameliorate disease symptoms.

Thus, the claims are rejected.

Conclusion

No claims allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joanne Hama, Ph.D. whose telephone number is 571-272-2911. The examiner can normally be reached Mondays, Tuesdays, Thursdays, and Fridays from 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Paras, can be reached on 571-272-4517. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public. For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

/Joanne Hama/
Primary Examiner
Art Unit 1632